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see Mahomet placarded as an impostor, when the world is ready to mete out the same measure to every religious teacher who thinks "economy" advisable in the dispensation of truth; to every Christian minister who subscribes to a solemn creed "for substance of doctrine," some particulars of which he does not believe, or who acknowledges among his brethren more liberality of sentiment than he considers "safe" for the people of his charge; to every writer who wilfully devises claptrap; to every politician who uses, to serve his own purposes — the nation's good being identical with his own, of course — party watchwords which he knows to be founded on wrong or misapprehension in the multitude; to every leader, in short, who, in his zeal for the instruction of the people, alters, disguises, or embellishes the truth. Of odium thus equitably distributed, we honestly believe Mahomet could afford to accept his full share.

Art. II. — *The Voyage and Shipwreck of St. Paul; with Dissertations on the Sources of the Writings of St. Luke, and the Ships and Navigation of the Ancients.* By James Smith, Esq., of Gordanhill, F. R. S., &c. London: Longmans. 1848. 8vo. pp. 307.

The author of this book is an English gentleman of education, fortune, and leisure, "a yacht sailor of more than thirty years standing," who has concentrated all the resources of extensive study, observation, and maritime experience on the illustration of the narrative of St. Paul's shipwreck. The result has been, in the first place, the identification of every locality, the delineation of every nautical equipment and manœuvre, and the verification of every incident recorded by the sacred historian; and, secondly, the accumulation of materials of unprecedented copiousness and interest as regards the construction and management of ancient ships. On account of the large amount and variety of general information which it furnishes, and also because of the numerous authorities on our table this is the only recent publication, we have selected it as a text for an article on the Navigation of the Ancients, and would confess at the outset our indebtedness to it for much that we have learned from it, and for much more which it taught us where to find.

The history of navigation commences with the launching of the ark on the waters of the deluge; and it is not a little singular that the artistical merits of this extraordinary structure should have been unrecognized for four thousand years or more. To be sure, now and then a mathematician who revered the Bible had said a patronizing word or two about the ark as a thing that might possibly float without capsizing; and Bishop Wilkins, no mean authority, had given his opinion, that it could not have been built more appropriately for its purpose. But it was reserved for Peter Janson, a Dutch merchant of the seventeenth century, to adopt it for a model; nor can Noah have encountered severer missiles from the ridicule of antediluvian wags, than annoyed honest Peter while his ship was in building. But he had faith enough in the Hebrew record to build an ark in the precise proportions of that which had saved the patriarch's family; and it was found on trial most admirably adapted for bulky cargoes, as it had 30 or 40 per cent. more available tonnage than ships of the usual model requiring the same number of mariners.

The chief objection to its use was, that it had not, like its prototype, the monopoly of the sea, and that, on ocean paths infested by buccaneers, it could not be manœuvred rapidly or adroitly enough to evade pursuit. But it is believed that Janson's experiment led to the general adoption for the carriage of bulky freights of what is commonly called "the Dutch build," of which our ships designed for the cotton trade, and often exceeding by 20 per cent. their ratable tonnage, are fair specimens.

Among the most ancient nations, the Egyptians and the Phœnicians took the lead as navigators. The Egyptians built their boats from the root, cut their masts from the stalk, made their sails from the bark, and twisted their cordage from the stoutest fibres, of the papyrus. These vessels were not, and probably could not be, trusted as sea boats; but they served the purpose of an extensive inland trade on the Nile and the numerous canals which it fed. The Phœnicians, on the other hand, masters of a sterile and rugged country, driven to commerce by the paucity of their agricultural gains, and having equal access to the Mediterranean and the Red Seas, established maritime intercourse with the most remote coasts of the then known world. Of the details of their naval architecture we know nothing; but from the extent and danger of their voyages we may infer that they had attained no inconsiderable amount of skill. Sidon was their chief port, and before the Homeric age, they had undoubtedly reached India as their eastward terminus, while they had planted colonies beyond the Pillars of Hercules.

It was by means of Phœnician navigators that Solomon conducted the traffic, which flooded his capital with the precious metals, and made his reign proverbial throughout the regions of the East for wealth and magnificence. Ophir and Tarshish were the chief emporia of this commerce. As to the locality of Ophir, there is almost a world-wide difference of opinion. The three years consumed in making the voyage, and the identity of the radical letters of Ophir and Peru, have given rise to the irrational hypothesis that the New World furnished gold for the Hebrew temple. Gesenius supposes Ophir to have been a portion of the sea-coast of Arabia, as that name stands in Genesis among Arabian countries, and may itself be traced, as he thinks, to an Arabian origin. But if this were the case, the gold and silver, as well as the ivory and peacocks, brought thence, must have been imported, not indigenous. Eastern Africa, which has also been supposed by many to have been the terminus of these voyages, could not have furnished the precious stones or the sandal [*almug*] wood, which made part of the return cargoes. Josephus, who probably was not without traditional authority, speaks unhesitatingly of Ophir as having been the Chersonesus Aurea, now known as the peninsula of Malacca. It is believed that there are none of the commodities named as the products of Solomon's commerce which Malacca might not have furnished from within its own borders, or from nearly adjacent regions. Nor will the voyage appear unreasonably long, when we consider that the ancients coasted where they could, transacted much business from port to port, and had not vessels so rigged as to enable them to cross the Indian Ocean except under favor of the monsoons.

As to Tarshish, the other principal mart of Hebrew traffic, the learned have been still more widely divided, it having been questioned whether there was such a place, or whether the word may not be a generic term either for a gold region or for the sea. But we find no valid reason for doubting that this name denotes a flourishing Phœnician city and colony on the Spanish coast. To be sure, *ships of Tarshish* are sometimes mentioned in the Bible, where it is impossible that the reference can be to the region that we have named. But this phrase probably denotes vessels of a peculiar construction, such having been first built either at Tarshish, or for the Tarshish trade, just as the English call all vessels of a certain model *Indiamen*, and as, in Massachusetts, there is a certain class of small fishing vessels called Chebacco boats, simply because the first in use were built in the ancient Parish of Chebacco, in Gloucester.

Herodotus describes an exploring expedition, undertaken by a Phœnician fleet under the orders of Pharaoh Necho, who flourished about 600, B. C.; and, if we interpret his words literally, and suppose the narrative authentic, these navigators must have doubled the Cape of Good Hope, and ascended the Western coast of Africa. But the swell occasioned by the junction of the Atlantic and the Indian Ocean is so great at all seasons of the year, that a vessel can make the passage only by standing out to sea; and there is no reason to suppose that the Phœnician vessels, at this early period, were capable of holding off from the shore of the Cape of Good Hope under any possible circumstances of wind and current, so as to avoid shipwreck. Moreover, this discovery of Western Africa is not once alluded to by any ancient writer, but on the other hand, it is expressly asserted by several authors who must have been familiar with Herodotus, that Africa had never been circumnavigated till a much later period. Yet more, in the time of Ptolemy, Africa was universally supposed to sweep round the Indian Ocean, so as to join the continent of Asia to the eastward of Malacca. Pharaoh's navigators undoubtedly reached a southern latitude, but their explorations were probably confined to the Atlantic coast.

Ancient Greece was adapted to maritime enterprise by the character alike of its people and their country. Most of the Grecian states, having been planted by colonists from other shores, inherited from the generation of their founders decidedly seafaring propensities. Then, too, Greece has more sea-coast than almost any other region of similar extent, and abounds in harbors accessible and safe for such vessels as constituted the commercial marine of remote antiquity; while the Ægean Sea is so thickly studded with hospitable islands, that the navigator need seldom have been out of sight of land, and might haul his vessel on shore almost every night, — both which advantages were of inestimable price, in the unformed condition of nautical astronomy, and the absence of the mariner's compass.

The fabulous portion of Grecian history refers repeatedly to maritime adventures and incidents; but the earliest expedition of importance, of which we have a detailed account, is that of the Argonauts. With regard to this, it is difficult to separate fact from fiction. That a band of heroic spirits accompanied Jason, we cannot doubt; but it is hardly probable that Hercules, Castor, Pollux, and Orpheus were all with him; and it is the tendency of popular mythology to indulge freely in anachronisms, in order to group as many illustrious names as possible around every memorable event or hazardous enterprise. The expedition was without doubt predatory in its design, and some light is cast upon it by the coincidence of the Phœnician word denoting treasure with the Greek μαλλός, which signifies *fleece*. In plain terms, Colchis was a rich kingdom, inhabited by a people given to arts rather than arms, and the *élite* of Grecian chivalry undertook this voyage for the sole purpose of robbery. The amount of authentic information blended with fable concerning the various countries on the Euxine Sea, in the Orphic Argonautics, makes it certain that Jason landed at almost every practicable spot, and is strikingly illustrative of the circuitous and tentative method in which the ancients felt their way towards unknown regions. This voyage may be regarded as having greatly enlarged the geographical knowledge of the Greeks, and as having, in at least an equal degree, extended the limits of their ignorance; for the voyagers, on their return, seem to have incorporated into their narrative all countries and bodies of water of which they had heard the name. Thus, from the Palus Mæotis, they are represented as having passed through a great gulf into the *Cronian* Ocean, after various adventures in which they enter the Mediterranean through the Pillars of

Hercules! But of the Cronian Ocean, to which name there was no nearer counterpart than the White Sea, they must have heard from the Scythians, and entered it on their log-book, because it was essential to a finished nautical reputation to have explored it.

From this period, we may date the colonial system of the Greeks, which gradually extended itself from the Pillars of Hercules to the northeastern extremity of the Euxine Sea. The colonies retained an intimate connection and a lucrative commerce with their parent states; and Athens and Corinth, on the score of their extended and various intercourse and traffic, were viewed in very much the same light in which the three great commercial capitals of modern civilization are now regarded. Attica, especially, with a soil unfitted for wheat, relied on commerce for the prime necessities of subsistence, while her silver mines and her olive plantations made her merchants preferred purchasers in every part. We find very early record of double voyages from the Piræus, wine having been first purchased at some of the islands in the Ægean Sea, and exchanged on the shores of the Euxine for wheat, wool, hides, or slaves. The rude beginnings of maritime law may be traced back to the early age of the Athenian republic; loans on bottomry, or on floating security, having been the subject of peculiar enactments, as regarded both the rate of interest and the reimbursement of the principal.

Nor was the navigation of the Greeks confined to pacific purposes. Maritime war is hardly less ancient than commerce; and in point of reputed rank, the buccaneer of the early ages took precedence of the merchant. The Athenians were probably the first people that had a regularly appointed and equipped navy. But their naval service was a prominent part of the public administration. Their war-galleys were divided into two classes, corresponding to our frigates and transports, though after a few years' service, a fighting vessel was often passed over to the transport list. The Athenian war-galleys frequently carried two hundred mariners, besides thirty or forty *epibatæ*, — a class of soldiers like our marines, performing military, but no nautical, duty on shipboard.

The Iliad and Odyssey furnish the greater portion of the materials in our possession, as to the condition of nautical skill and art prior to the Homeric age. The enumeration of the fleet that carried the allied troops to Troy, though undoubtedly fabulous and exaggerated in its details, must have been not far beyond the range of probability; and, if so, a numerous squadron of ships must have already become a familiar idea. As to the size of the Homeric ships, we have in the Iliad no indication, except in the census of the Bœotian quota of forces, which consisted of fifty vessels, with a hundred and twenty men in each. From the description of the ships built by Ulysses on Calypso's island, we may infer that the keel was laid, and the sides ribbed and covered in substantially the same manner as is practised now. Full-decked vessels were not in use until a much later period; but a large ship generally had a partial deck, under which freight liable to injury might be stowed, and women or effeminate men might find shelter in stress of weather. Stones were the only anchors used; and they were employed rather for bringing vessels to than for mooring them, as in port they were always drawn up upon the beach, and launched anew for every passage. For this purpose, rollers were sometimes used; but more generally, human strength unaided by mechanical contrivance. The ship of that age must needs have been very light in proportion to its capacity; and we find no reason to suppose that metallic fixtures of any kind, except nails and spikes, were deemed essential. Indeed, there were instances in which large ships, nay, fleets, were dragged across very considerable portages. This was done across the isthmus of Corinth, in two instances, according to Thucydides. But the navigators of those ages were more ready at all times to cleave to mother earth than to trust their own element. It was a rare event for a vessel to lose sight of land, and the most approved mode of progress was by daily stages, so as to make a port every night. Yet, when a ship was driven out to sea, or when it was impossible from the nature of the voyage to "hug the shore" all the way, there was a sufficient knowledge of celestial phenomena to direct the course with reasonable accuracy. The Homeric ships were one-masted, and probably had but one sail. Such ships, without rudders too, could not be manœuvred with sufficient rapidity for attack or defence; and war-galleys therefore depended principally upon their oars, while merchant ships and transports were provided with full benches of oars, and with competent crews of oarsmen, who were kept on duty except when relieved by a fair and sufficient wind.

Close and constant as was the maritime intercourse of the Greeks within the limits already described, it was not till the time of Alexander the Great that they essentially enlarged their sphere of communication. The voyage of Nearchus, from the mouth of the Indus to that of the Euphrates, undertaken at the command of that monarch, formed an epoch in navigation, maritime knowledge, and nautical literature. We still have minute contemporary accounts of it, written by the admiral of the expedition. Eight hundred ships, (most of them probably no larger than a modern ship's long boat,) were placed at his direction. The voyage was protracted, eventful, and full of dread, if not of intense peril. It might now be made under favorable circumstances in a fortnight; — it took Nearchus about five months. Setting sail with the trade winds against him, and unskilled in traverse sailing, he made but eighty miles in the first forty days. His men were reduced to the greatest distress by want of food and water; for the seemingly obvious necessity of laying in provisions for a long voyage was not then understood, and their course lay by an inhospitable coast, that furnished them nothing but shell-fish. They subsequently stood out to the south, and Nearchus says, that they reached a point where the mid-day sun was in the zenith, and objects cast no shadow. This is hardly probable, as the sun was at that time in southern declination; and, had Nearchus actually crossed the equator and entered the southern hemisphere, it is impossible that he should not have described the temperature and the aspect of the heavens, so entirely unlike those of the regions with which he had been familiar. The more plausible account of the matter is, that he had heard that there were remote southern latitudes where objects were shadowless at noonday, and that, by a broad poetical license, he sought to multiply his own marvellous experiences for the amazement of his readers. One of the most important incidents of the expedition was the spouting of several whales, which filled the whole fleet with consternation, till the animals, in their turn alarmed by shouts and the clashing of arms, sank quietly beneath the water. It was probably the great account made of this event in the narrative of Nearchus, that inspired Horace's fearful mention of the "*monstra natantia*," among the perils braved by the earlier navigators. Next to this rencounter, the chief annoyance of our voyagers was connected with a change of diet; for they made sore complaint, not only of an enforced series of fish dinners, with no farinaceous condiment, but of the fishy flavor of their mutton, which, they said, was fattened on no other food but such as the waters yielded. Indeed, so deeply impressed were they with the dietetic habits of the tribes with which they kept up a coasting, gossiping intercourse for many days, that they included them all under the generic name of Icthyophagi. The information contained in the several narratives of this voyage now extant is at once minute and vague, indicating the utmost receptivity of eye and ear, without the power of weighing evidence, of balancing contradictory statements, or of arranging, connecting, and classifying isolated facts.

The Carthaginians next claim special notice as a great maritime power. We study their history and character at a disadvantage, deriving, as we do, almost all our knowledge with regard to them from their rivals and enemies, the Romans. Their commercial reputation could hardly have been won and sustained, and they have continued for many centuries chief factors and carriers for the whole civilized world, had Punic faith been held at as paltry a valuation in port and market as in the Roman Senate. Their trade had its regular depots, periods, and courses, and consequently must needs have made them dependent on their own trustworthiness for the confidence reposed in them. They undoubtedly, in the conflict of wits, in all diplomatic tactics, could readily get the better of their rude antagonists; for their commercial habits gave them superior adroitness in negotiation. They had numerous colonies in Africa, Spain, and the islands of the western Mediterranean. Though they seldom ventured beyond easy reach of land, they were familiar with almost the whole Atlantic coast of Europe. Gades (now Cadiz) was the chief entrepot of their traffic in this direction. Tin was among their principal imports, and in quest of it they made frequent voyages to Britain and to the Cassiterides, which Heeren shows beyond dispute must have been the Scilly islands. There is little doubt that their regular route of trade extended as far north as Scandinavia.

How early they were extensively acquainted with the African continent must be determined by the view taken of the *Periplus of Hanno.* This is a narrative (extant in Greek) of a voyage of discovery and colonization under the command of Hanno, a Carthaginian leader, undertaken about five centuries before the Christian era. There can be but little question, that this document is either a translation or an abridgment of the record actually deposited by the commander in the temple of Saturn; for the course of the voyage can be distinctly traced, and there is hardly a circumstance related which savors of fable or even of exaggeration, unless it be the immense number of persons attached to the expedition, it being no less than thirty thousand. Now, that Carthage could have sustained a depletion to that extent and left no other trace of it in history, or that the ends of public policy should have dictated the deportation of so large a body of citizens, is intrinsically incredible. But in the modes of numerical notation adopted by most ancient nations, there was ample room for misconception or erroneous transcription; and it is a well known fact, that numbers have fallen into inextricable confusion in writings the text of which is in all other respects pure and reliable. Hanno left the greater portion of his companions at the outset of his voyage, founding on what is now the Morocco coast no less than six well appointed colonies. From the last of these he twice sailed in a southward direction, the first time reaching the mouth of the Senegal, and the second descending as far as that of the Gambia. The closing incident of this last voyage is related with an air of quiet indifference worthy of our backwoodsmen of the Daniel Boone school, who, if they can get a fair aim with the rifle, care little whether they bring down a panther or an Indian.

> "Though we pursued the men, we could not seize any of them; but all fled from us, escaping over the precipices, and defending themselves with stones. Three women were however taken; but they attacked their conductors with their teeth and nails, [*δακνουσαὶ τε καὶ σπαϱάττουσαι*,] and could not be prevailed on to accompany us. Having killed them, we flayed them, and brought their skins with us to Carthage."

Hanno, though evidently not overstocked with humanity, seems to have been a careful and judicious explorer, and may be regarded as having opened to Carthage the coastwise trade of the African continent. We find that, at a shortly subsequent period, Punic enterprise had traced the receding outline of the continent as it trends towards the east, and had established a productive traffic with the Gold Coast.

The Romans took the lead in no department of maritime enterprise, were behind all other civilized nations in nautical knowledge and skill, and only late and reluctantly availed themselves of the sea as of a military road, or a battle ground, or as an essential medium for the conveyance to Rome of corn, wine, the plunder of conquest, and the revenues of proconsular extortion. Agriculture was the only profession besides that of arms which they held in honor, and even that was esteemed chiefly as developing the physical hardihood, and the almost incredible power both of labor and endurance, which distinguished the Roman soldiery. They despised commerce, deemed it utterly unworthy of a patrician, and regarded the equestrian order as degraded from its pristine dignity by the numerous members of its body who were engaged in traffic. The most liberal estimate in which the mercantile profession was ever held among them might be expressed in these words of Cicero: "*Mercatura si tenuis est, sordida putanda est; sin magna et copiosa, multa undique apportans, multisque sine vanitate impertiens, non est admodum vituperanda.*" At the same time (and we fully accord with the sentiment) he says: "*Omnium rerum, ex quibus aliquid acquiritur, nihil est agriculturâ melius, nihil uberius, nihil dulcius, nihil homine libero dignius.*" In accordance with this state of feeling, it was not till the first Punic war, when they were obliged to cope with a nation of immense maritime resources, that the Romans gave their attention to the equipment of a fleet, or even to the principles of ship-building. In the later days of the republic, and under the emperors, they had numerous and well appointed navies, both military and mercantile, and became familiar with all the maritime routes known to the ancient world; but were always more ready to profit by the nautical skill and prowess of allied or subject nations, than to take active means for cherishing naval enterprise among themselves. Sicily and Egypt were the granaries of Italy; and the necessities of Rome and its densely populated vicinity kept an immense fleet in constant activity during the portion of the year favorable to navigation.

We propose now to give a succinct sketch of the construction and management of ancient ships at the period when the naval art had reached its highest degree of perfection. It is a subject on which no set treatise has come down to us from antiquity; but our information must be gleaned from incidental notices, coins, the marbles and paintings of Herculaneum and Pompeii, and certain inventories of the appurtenances of the Attic navy, discovered in digging up the foundation of a house in the Piræus in 1834. In addition to these sources, during the reign of Commodus, an Alexandrian wheat-ship was driven by stress of weather into the Piræus; and Lucian, attracted by her extraordinary size and exquisite finish, lays the scene of his dialogue, *Πλοῖον ἢ 'Ευχαω*, on board of her, and gives through his interlocutors many details regarding her structure and internal economy.

The prow and the stern of the ancient ships were very similarly built, and both rose by a very considerable elevation above the body of the vessel, and were generally furnished with projecting galleries. Hence the epithets *alta* and *celsa* so constantly applied to *puppis* by the poets. The prow was of course made sharper than the stern, and was distinguished by the *rostrum* or beak, which, on some medals of an early age, appears three cleft, whence the *trifidum rostrum* of Silius Italicus and Virgil's *rostris tridentibus*, — a reading which, on conjectural grounds alone, some modern editors have changed into *stridentibus*. The general similarity of both ends of the ship rendered it as easy to anchor her by the stern as by the bow; and that this was sometimes done would appear from the figure of a ship found in a painting at Herculaneum, in which there is a hawse-hole aft, and a cable hanging from it at an angle indicating that there is an anchor appended to it. The ancient navigators, from their habit of keeping near the coast, and from the impossibility, with rigging like theirs, of working off from a lee shore, must have been more dependent than the moderns on their ground tackle. In certain positions, a ship could be brought to with greater expedition and safety by anchors dropped from the stern; and, when a vessel was to be run ashore, which was by no means an infrequent resource, this mode of anchorage put her immediately at command, so that she could at once be directed to the safe place on the shore, and the cables then slipped; whereas, if anchored from the bow, she was liable to take a wrong cast, and drift too far to the leeward before she could be brought under command.

Rudders hinged to the stern-posts were not in use until the thirteenth century. Prior to that period, vessels were steered by two large paddles, worked one on each side of the projecting stern. In small vessels, these rested in rowlocks in the upper gunwale; and in those of larger dimensions, they were passed through ports, which served also as hawse-holes. When at anchor, the rudders were drawn in, and secured by lashings to the ship's sides. This mode of steering must, indeed, have been toilsome in the extreme; but every mariner was trained to the use of the oar, the ships were numerously manned, and there was but little other hard work to be done. Our readers may here be reminded of the frequency with which πηδάλιον and *gubernaculum* occur in the singular, and of the uniform mention of a single pilot as governing the course of the ship. This is explained by the fact that the two rudders were generally united by a cross-bar, and thus were managed by the same man, or, in a very large ship, by the same set of hands. The pilot's elevated position was essential to his office. In default of the compass, he needed an unobstructed view of the heavens and of distant landmarks; and, when cloud or fog concealed the sun or the stars, the keen and practised ear stood sentinel in lieu of the eye, so that he was no pilot, who knew not the voices of Aquilo, Notus, and Eurus, or who discerned not the roar of the breakers while it was still a far-off whisper. The pilot had his tutelar deity close at hand; for every vessel had its own divinity, whose image graced the stern, and whose name not unfrequently furnished the sole designation for the vessel. Nor was it unusual for the more devout to multiply these images, and to crowd the stern-gallery with the forms or insignia of all the deities wont to be invoked in maritime emergencies. Thus, in the shipwreck described by Persius in his *sixth* Satire,

> "Ionio jacet ipse in littore, et unà
> Ingentes de puppe dei."

Horace undoubtedly refers to this same custom, when, in apostrophizing the republic under the image of a ship, he says, —

"Non tibi sunt integra lintea,
Non Dî, quos iterum pressa voces malo."

The ancient style of rigging was exceedingly simple. We cannot recall an instance, in which the plural of *ἱστός* or of *malus* is used with reference to a single ship, nor can we refer to any transmitted figure of a ship in coin or picture, which has more than one mast worthy of the name. This occupied a position a little forward of midships. The chief, and often the sole, reliance for progress was placed on a huge square sail attached to a yard nearly as long as the ship itself. In stormy weather, this great sail was furled, and one or two triangular sails, with the apices below, substituted for it. Triangular topsails are found on some of the coins of the Emperor Commodus, but seem not to have been in general use until a much later date. There is reason to believe that top-gallant sails were, in some individual instances, employed; and that, in fine weather, extra sails, corresponding to our studding sails, were spread. A mizzen-mast was very rare; and, when there was one, it was the slightest spar possible, and rigged with a very diminutive sail. The only essential sail besides the mainsail was the jib or foresail, which was square, fastened to a horizontal yard, and attached to a spar occupying the position of a foremast, and taking the direction of a modern bowsprit. This sail was valued principally as an aid in steering, and in keeping the head of the vessel true to her course; but could have been of little assistance as regarded speed.

We are uninformed as to the angle with the wind, at which ships thus equipped could sail. It is very certain that the ancients had no idea of the possibility of reaching a place directly to the windward by successive traverses; but they undoubtedly were able to sail within seven or eight points of the wind. As regards speed, we have the record of several voyages performed at the rate of from six to eight miles an hour, which would give, of course, a much greater velocity for the quickest portions of the passage.

Among the essential furniture of the ancient ship were *hypozomata*, or cables for tying the sides of the vessel together, either to preclude a strain during an impending storm, or to prevent the opening of the seams and the working of the planks, when the vessel had sustained an unusual shock by wind or wave. From the Attic inventories to which we have referred, it would appear that cables for this purpose were a regular item of naval stores, and as such laid up in the magazines. It is easy to conceive that ships might have been sufficiently frail in their structure to have needed this additional security, though at the present day such a necessity would condemn a vessel as unseaworthy. But there have been several instances in modern times, in which resort has been had to a similar expedient. In 1815, when the Russian fleet was sailing from England to the Baltic, one of the ships, having been severely strained, was held together by three or four turns of cable taken midships. Capt. Back, on his return from his Arctic voyage in 1837, bound up his shattered ship with two lengths of chain cable, passed under the bottom, hove tight by the capstan, and fastened to ring-bolts in the quarter-deck. An English *seventy-four* was in one instance saved from sinking by similar means; and recourse has been several times had to the same contrivance in the British navy.

In point of capacity, the ships of the Augustan age must, some of them, have been equal to our largest merchantmen. The ship in which St. Paul was wrecked had 276 persons on board. That in which Josephus was wrecked carried 600. The ship commemorated by Lucian was 180 feet long by 45 broad, which, by the usual rules of computation, would give her a measurement of more than 1300 tons; but the projection at her extremities would probably reduce her actual tonnage one fourth. The ships regularly engaged in the wheat trade were the very largest vessels in the merchant service, inasmuch as there were no others so sure of a full freight, and no other cargo of which the bulk was so large in proportion to the value.

As regards the accommodation of those on board, the earliest navigators must have submitted to the severest hardships. Before decked vessels were in use, there could have been neither shelter from the weather, nor safety for the provisions of the crew. Alcibiades was the first Greek who swung in a hammock; and this is cited as one of the most signal instances of his slanderous effeminacy. But before the Augustan age, separate cabins were constructed, and many of the luxurious appliances of shore life were enjoyed on shipboard. The suspension of navigation through the winter superseded the invention of many of the modes of protection now deemed necessary both for officers and mariners; and the latter seem not to have had any enclosed portion of the ship specially devoted to their use.

The arrangement of the benches of oars in the ancient galleys has largely exercised the ingenuity of modern antiquaries. The trireme was the most common form; but we frequently read of quinquiremes and even of octoremes, while, according to Pliny, the royal galley of Ptolemy Philopator had fifty banks of oars. If the sides of the galley were nearly perpendicular, only the lower rank of rowers could have performed any essential service; and the oars of the upper tiers must have been too long to have been managed single-handed. But we may without difficulty suppose the sides above the water's edge to have flared sufficiently to make an angle of 45° or even 40° with the water. In that case, the several ranks of rowers occupied successive stagings, each kept from interfering with that next below rather by teral distance than by superior height. By this arrangement, three tiers of rowers could easily have been so seated as to apply their strength without disadvantage; and even in an octoreme, though those of the upper tier must have had a post of peculiar hardship, we can conceive that they may not have labored wholly in vain. As for Ptolemy's galley, we see no improbability in supposing the same arrangement, if we take into the account what Plutarch says of it, that "it was little better than an immovable building, more calculated for show than use." The oars of the highest rank were 57 feet long, and of course could not have been pulled by one man, nor yet by a gang of men with sufficient rapidity to give much propelling force. The vessels of war were always galleys, and generally triremes. In an engagement, the upper gangways were cleared of oars, and those who manned them became active combatants, while the vessel was manœuvred by the rowers of the lower tier.

The professional character of ancient navigators seems to have been much less distinctly marked than is the case at present. Naval commanders were not a class by themselves; but the successful general was deemed an amply qualified admiral, while the conscripts for the army were, when occasion demanded, drafted for the navy. In the merchant service, the owner, captain, and factor were frequently one and the same man, and his sailors, in their long intervals of shore life, must have resorted to other employments, and cannot have acquired the peculiar dialect, habits, and prejudices, which would make them a class by themselves. Even their nautical experience had little to distinguish them from their fellow-citizens. It required more strength than skill to pull an oar, nor was there any special sea-craft needed for the management of the two simple sails, which were the only ones with which nine tenths of the vessels were equipped. On the other hand, landsmen, in default of level roads and easy conveyances, made most of their long journeys by water; and civilians, ambassadors, men of learning, and youth in the process of liberal education were all more or less familiar with the paths and perils of the deep.

Ancient navigation seems to have been straitened not so much by the lack of art, as by the absence of science. Its structures and implements were well adapted to the circumscribed sphere of its exercise, and indicated a degree of mechanical skill and genius, which could not have lingered in the rear of scientific discovery and improvement. But there were two essential desiderata in the nautical knowledge of classic antiquity. One was a mode of determining a ship's place at sea, the other, a mode of directing a ship's course in cloudy weather. The chronometer and the log are both modern inventions. Though after the Ptolemaic epoch the materials of accurate astronomical science were rapidly accumulated, they did not for many centuries assume the tabular form, in which alone they could be employed for purposes of observation. Nay, so long as the lesser equations of the solar and lunar motions were undiscovered, tables and instruments would have misled and bewildered the navigator in the precise proportion in which reliance was placed upon them. We have no proof that any mode of determining place or distance at sea was in use until the middle ages, except that the Romans employed occasionally both by land and water an *odometer* so complicated in its structure, and so difficult to be kept in gearing, as to need verification whenever used.

All this while, the loadstone was well known in southern

Europe, as endowed with the power of attracting iron, and as communicating its own properties to iron; but the polarity of the magnetized needle was not even suspected. Yet for more than a thousand years before the Christian era, the principle of the mariner's compass had been understood and applied in China. In the age of Codrus, magnetic carriages were employed in traversing the vast grass plains of Tartary; and, under the emperors, Roman ships must often have encountered on the Indian Ocean Chinese junks under this same mysterious pilotage. Had it fallen to the lot of the Phœnicians or the Carthaginians to make this discovery, California might have been their Ophir and Russian America their Ultima Thule; and we might have been inditing our lucubrations in "the letters Cadmus gave." Had Athens in the Periclean, or Rome in the Augustan age, possessed the needle, there was not lacking the requisite intelligence to guide, or enterprise to consummate, the attempt to verify the rotundity of the earth. But the Chinese kept their precious secret, as Æsop's dog guarded the manger. Indeed, they could have made no worthy use of it without rendering it the common property of the civilized world. A thoroughly self-isolated nation then, as now, they held communication only with allied, or tributary kingdoms, and excluded foreigners, so that their arts were as unlikely to be learned and copied elsewhere, as if they had been denizens of the moon. The knowledge of the relation of the magnet to the terrestrial poles was at length, in the thirteenth century, brought to Europe through the Arabs, who seem to have been the providentially appointed conductors of Oriental art and science to the Western nations just emerging from the lethargy of the dark ages.

We have spoken of what might have been, had the more enterprising nations of antiquity enjoyed the means of certain self-direction on the ocean. This suggests the inquiry as to the state of geographical belief or theory among enlightened men. That the earth was spherical was, no doubt, from the remotest ages, the prevalent belief, not indeed of the multitude, but of those whose philosophy transcended the sphere of the senses. Pythagoras had inferred this truth from the different altitudes of the same star as seen at the same time from different places, — a demonstrative evidence, which could never have appeared less valid than it did to him. That the then known world was much less than a hemisphere was sufficiently obvious. Thence was inferred the existence of a counterbalancing continent, of Antichthones or Antipodes. This notion is distinctly recognized in the following passage from the *Astronomica* of Marcus Manilius, written not long after the Christian era.

> "Altera pars orbis sub aquis jacet invia nobis,
> Ignotæque hominum gentes, nec transita regna
> Commune ex uno lumen ducentia sole,
> Diversasque umbras, lævâque cadentia signa,
> Et dextros ortus cœlo spectantia verso."

The same opinion has left its traces in the seventh book of the Æneid.

> "Audiit et si quem tellus extrema refuso
> Submovet oceano, et si quem extenta plagarum
> Quatuor in medio dirimit plaga solis iniqui."

This same supposition led to the belief of circumnavigations that can never have taken place. Thus we have seen that the Argonauts were supposed to have returned from their Western voyage through the Fretum Herculeum; and the voyages of Eudoxus and of Hanno received from ancient commentators not dissimilar expositions. Pomponius Mela, a geographer of the first century, in his description of the earth, evidently identifies the unknown continent with the southern triangle of Africa. He carries Africa but little beyond the Niger in a southerly direction, extends it thence westward to the outlet of the Red Sea, and terminates it by a peninsula which juts out into the Indian Ocean. South of this continent he places the ocean which surrounds and divides the two hemispheres. He then locates the continent of the Antichthones as a distinct southern hemisphere, describes it as triangular in contour, with the apex at the south, and makes its base coextensive in longitude with the united continents of Africa and Asia. This hypothesis enables him to cut the knot, which the geographers of so many centuries failed to untie. He places the sources of the Nile in this unexplored hemisphere, and supposes that river to pass under the ocean and to reappear in Æthiopia.

Had we space, we might find much worthy to be written concerning the ancient literature of the sea. The delineation of nature in any of its aspects was seldom a direct or express object with the earlier writers. Descriptive poetry may be almost regarded as of modern origin; for even the ancient Bucolics were, for the most part, mere dramatic sketches with a rural background. The forces of nature were, to the outward sense too capricious and too formidable, and, in the belief of the Pagan world, too much distracted by the conflicting jurisdiction of benign and malignant divinities, to invite prolonged contemplation, or to cherish that safe and happy feeling which alone could give interest and fervor to the detailed description of natural phenomena. A sense of the divine unity, trust in an unslumbering Providence, the habit of beholding in the outward universe the reflection of unbounded wisdom and beneficence, — in fine, the entire circle of Christian ideas, must have been essential to the development of the descriptive view in literature. But the sea perpetually furnished the ancients with tropes, illustrations, and terms of comparison; and their very limited maritime experience excited the same sensations of awful beauty and unspeakable grandeur, which we attach to the vast expanse of the ocean. Indeed, often, when they are speaking of some shallow bay, or describing the quick, short swell of some inland sea, we can hardly believe that they had not traversed the Atlantic, and witnessed the full sublimity of its storm-lifted waves. This phenomenon may be accounted for by two considerations. In the first place, the ultimate elements of beauty and grandeur in the creation are few, though their combinations are innumerable. Modern fancy portrays the concrete forms. The imagination of the earlier ages seized upon their primitive elements, and, in lieu of detailed description, gave those single, intensely graphic traits, which reveal the very heart of nature, and, because they are so genuine and characteristic, bring before the mind any and every class of combinations into which they enter. The physiology of the torrent, waterfall, river, sea, and ocean may indeed be widely dissimilar; and yet, in the last analysis, (an analysis to which the imagination leaps intuitively,) the elements that please or move, astonish or enrapture, are the same, and the vivid outline sketch of one may seem drawn for all.* Secondly, the very limited maritime scenery, with which the ancients were conversant, was as vast compared with their knowledge and control of natural agencies, as are our more expanded views and experiences compared with our more ample knowledge and superior command of the elements. Without chart or compass, driven a few miles from the shore, the guiding stars veiled for the time from their sight, they felt the same fearful solitude, the same sense of isolation, powerlessness, and dread, that overwhelms us when a thousand leagues of ocean are between us and the nearest human dwelling.

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* We are reminded in this connection of an apostrophe to the sea, in the Prometheus of Æschylus, which in four words conveys much more to our apprehension, and reflects far more fully our own unutterable emotion in the frequent sur-

It is, indeed, beyond our power to overrate our indebtedness on literary grounds to the imperfect condition of ancient navigation. Had not the polarized needle been laid up in the Chinese limbo, where would have been the Odyssey? If Æneas had owned a chronometer, Dido would have remained till death loyal to the memory of Sichæus. A modern lyrist could hardly summon up so many phantoms of dread, and give vent to such fervent deprecations of evil for a Ross or a Franklin about to bury himself in polar night and ice, as Horace for Virgil bound on a pleasure-trip from Rome to Athens. Ovid has made richer materials for poetry out of a thunder squall on his voyage to the land of his exile, than a poet of our own day could find in a passage round Cape Horn; and to the terrors of this single storm, and his profound sense of the vast distance (now permeable in a week) which separated him from the imperial city, we owe his conversion from the merriest and most licentious to the most sombre and lachrymose of bards, — the very Jeremiah of profane literature. Scylla and Charybdis are not now of conse-

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vey of ocean scenery, than could be done by volumes of the most glowing, eloquent, passionate description. Whenever we look upon the ocean, whether from deck, beach, or crag, by sunshine, moonlight, or its own phosphorescent glow, we find ourselves absolutely haunted, sprighted by these words, as they pulse upon the inward ear in unison with the rhythm of the waves. The passage to which we refer is that where Prometheus, in calling on all nature to witness his cruel wrongs at the hand of Jupiter, addresses the sea as *ποντίων χυμάτων ἀνήριθμον γέλασμα*. This cannot be transfused without damage into another language.

> " 'T is odor fled
> As soon as shed."

We know not how to convey in current English the multiform unity indicated by the original " *The innumerable laugh of the sea-waves*," is literal, but awkward. " *The many twinkling smile of Ocean* " (which we copy from a Lexicon) is preferable on the score of euphony, but less adequate to the sense.

quence enough to deserve a place on a chart, or a moment's extra vigilance of the pilot, in the Strait of Messina. A modern shipmaster would as soon think of stranding his ship on Mount Blanc as on the Syrtes. Critics are utterly at fault in the attempt to ascertain where the island of the Sirens was; and the Circean cup with its brutalizing potion remains almost the only peril of serious concern for the mariner, in those waters that used to swarm with the direst portents, bearing the breath of an incensed god on every gale, girdling every islet and crowning every promontory with supernatural horrors.

The poetry of the sea must be written over again. Modern fancy in this department relies too much on the traditional names of effete images, and still reproduces in verse the dwarfed and obsolete forms of ancient wonder, awe, and terror, instead of taking to itself the fire wings of recent art and science, and enriching from its own peculiar vein the more just and adequate conceptions of the ocean and its laws that belong to the higher culture of the present age. The steamship has not yet found its laureate, and our modern Argonauts have no Orpheus among them. It would seem that in proportion as the ocean has occupied a larger and larger space in the prose of actual life, it has entered less and less into poetry and the higher fiction. We ask not that any one should set himself deliberately to write sea-lyrics, or sea-rhapsodies. The Muses ignore all task-work. But why is it that, while every poet travels by water as well as land, and every American poet crosses the Atlantic with the proceeds of his duodecimo firstling, they rarely give us the means of inferring, from a single verse of their inditing, that they ever beheld a larger body of water than the brook which, we believe, runs, by immemorial prescription, in the field behind every poet's dwelling?